

WHAT IS CLAIMED IS:

1. A method of treating unwanted hair, comprising transmitting acoustic waves through the hair so as to generate heat at a follicle, a dermal papilla, a hair bulge and/or a germinal matrix of the hair, said heat being in itself sufficient to damage or destroy said follicle, said dermal papilla, said hair bulge and/or said germinal matrix.
2. The method of claim 1, further comprising using a wave condenser for condensing said acoustic waves, prior to said transmitting of said acoustic waves through the hair.
3. The method of claim 1, further comprising gripping the hair prior to transmitting of said acoustic waves so as to enhance acoustic coupling between the hair and said acoustic waves.
4. The method of claim 3, wherein said gripping comprises positioning the hair and/or said wave condenser such that a propagation direction of said acoustic waves while entering said wave condenser is generally parallel to a longitudinal axis of the hair.
5. The method of claim 3, wherein said gripping comprises positioning the hair and/or said wave condenser such that a propagation direction of said acoustic waves while entering said wave condenser is generally perpendicular to a longitudinal axis of the hair.
6. The method of claim 3, wherein said gripping comprises positioning the hair and/or said wave condenser such that a propagation direction of said acoustic waves while entering said wave condenser is generally inclined to a longitudinal axis of the hair.
7. The method of claim 3, further comprising pulling the hair so as to effect a detachment of the hair.

8. The method of claim 3, wherein said acoustic coupling is characterized by a coupling length selected such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

9. The method of claim 8, wherein said coupling length is longer than about 1 mm.

10. The method of claim 8, wherein said coupling length is shorter than about 6 mm.

11. The method of claim 1, wherein said generation of said heat is such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

12. The method of claim 1, wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected so as to minimize vibrations of the hair.

13. The method of claim 12, wherein said vibrations of the hair comprises longitudinal vibration of the hair.

14. The method of claim 13, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 10 micrometers.

15. The method of claim 13, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 5 micrometers.

16. The method of claim 1, wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected such that said generation of said heat is such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

17. The method of claim 16, wherein said frequency is an off-resonance frequency.

18. The method of claim 16, wherein said acoustic waves comprise ultrasound waves.

19. The method of claim 18, wherein said ultrasound waves are at a frequency of at least 150 kHz.

20. The method of claim 18, wherein said ultrasound waves are at a frequency of at least 500 kHz.

21. The method of claim 18, wherein said ultrasound waves are at a frequency range of from about 150 kHz to about 1300 kHz.

22. The method of claim 18, wherein said ultrasound waves are at a frequency range of from about 500 kHz to about 1000 kHz.

23. The method of claim 1, wherein duration of transmission of said acoustic waves is less than about 5 seconds.

24. The method of claim 1, wherein duration of transmission of said acoustic waves is less than about 1 second.

25. A device (20) for treating unwanted hair protruding from a skin (30), the device comprising:

a transducer (22) for generating acoustic waves;

characterized in that the device further comprises a wave condenser (24), for gripping the hair (28) to establish acoustic coupling between said acoustic waves and the hair in a manner such that said acoustic waves are condensed, transmitted through the hair (28) past the skin (30) and generate heat at a follicle (31), a dermal papilla (32), a hair bulge (35) and/or a germinal matrix (33) of the hair;

said heat being in itself sufficient to damage or destroy said follicle, said dermal papilla, said hair bulge and/or said germinal matrix.

26. The device of claim 25, wherein said wave condenser is designed and constructed such that a propagation direction of said acoustic waves while entering said wave condenser is generally parallel to a longitudinal axis of the hair.

27. The device of claim 25, wherein said wave condenser is designed and constructed such that a propagation direction of said acoustic waves while entering said wave condenser is generally perpendicular to a longitudinal axis of the hair.

28. The device of claim 25, wherein said wave condenser is designed and constructed such that a propagation direction of said acoustic waves while entering said wave condenser is generally inclined to a longitudinal axis of the hair.

29. The device of claim 25, wherein said acoustic coupling is characterized by a coupling length selected such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

30. The device of claim 29, wherein said coupling length is longer than 1 mm.

31. The device of claim 29, wherein said coupling length is shorter than about 6 mm.

32. The device of claim 25, wherein said transducer and said wave condenser are designed and constructed such that said heat at said follicle, said dermal

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papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

33. The device of claim 25, wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected so as to minimize vibrations of the hair.

34. The device of claim 33, wherein said vibrations of the hair comprises longitudinal vibration of the hair.

35. The device of claim 34, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 10 micrometers.

36. The device of claim 34, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 5 micrometers.

37. The device of claim 25, wherein at least one of: a frequency, a power density and a duration of transmission of said acoustic waves is selected such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

38. The device of claim 37, wherein said frequency is an off-resonance frequency.

39. The device of claim 37, wherein said transducer is an ultrasound transducer generating ultrasound waves.

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40. The device of claim 25, wherein said transducer comprises an active element selected from the group consisting of a piezoelectric ceramic element, and a piezoelectric composite element.

41. The device of claim 40, wherein said transducer comprises a first part and a second part, each of said first part and said second part comprises at least one active element.

42. The device of claim 40, wherein said wave condenser comprises a first part coupled to said first part of said transducer, and a second part coupled to said second part of said transducer.

43. The device of claim 40, wherein said transducer comprises a planar active element.

44. The device of claim 40, wherein said transducer comprises a concaved active element.

45. The device of claim 40, wherein said transducer comprises a plurality of active elements arranged on a surface.

46. The device of claim 45, wherein said surface is a plane.

47. The device of claim 45, wherein said surface is a concaved surface.

48. The device of claim 25, further comprising a focusing element coupling said transducer and said wave condenser, said focusing element being designed and constructed to focus said acoustic waves into said wave condenser.

49. The device of claim 48, wherein said transducer comprises a first part and a second part, each of said first part and said second part comprises at least one active element.

50. The device of claim 40, wherein each of said wave condenser and said focusing element comprises a first part and a second part, and further wherein said first part of said focusing element couples said first part of said transducer and said first part of said wave condenser and said second part of said focusing element couples said second part of said transducer and said second part of said wave condenser.

51. The device of claim 48, wherein said focusing element comprises a tapered housing.

52. The device of claim 51, wherein a profile of said tapered housing is selected from the group consisting of a stepped profile, a linear profile, a segmented linear profile and an exponential profile.

53. The device of claim 45, further comprising a plurality of focusing elements arranged such that each focusing element of said plurality of focusing elements is connected to one active element of said plurality of active elements and being designed and constructed to focus a respective portion of said acoustic waves into said wave condenser.

54. The device of claim 39, wherein said wave condenser comprises a chamber configured to receive the hair such that energy of said acoustic waves is transferred to the hair from a plurality of directions.

55. The device of claim 54, wherein said chamber contains an ultrasound transmission gel.

56. The device of claim 54, wherein said wave condenser comprises a surface characterized by a radius of curvature of from about 1 millimeter to about 10 millimeters.

57. The device of claim 56, wherein a shape of said surface is selected from the group consisting of a sphere, a cylinder, an ellipsoid, a paraboloid, a hyperboloid and any combination or portion thereof.

58. The device of claim 25, wherein said wave condenser is operable to split thereby to form a gap for receiving the hair.

59. The device of claim 25, wherein said wave condenser and said transducer are operable to split thereby to form a gap for receiving the hair.

60. The device of claim 48, wherein said wave condenser and at least one of said transducer and said focusing element are operable to split thereby to form a gap for receiving the hair.

61. The device of claim 58, further comprising a drive mechanism for imparting a motion of said wave condenser relative to the hair.

62. The device of claim 61, wherein said wave condenser is operable to periodically split and reassemble in a manner such that when said wave condenser splits, the hair engages said gap, and when said wave condenser is reassembled, the hair is gripped by said wave condenser and irradiated by said acoustic waves.

63. The device of claim 61, wherein said drive mechanism is configured to impart a rotary motion to said wave condenser.

64. The device of claim 61, wherein said drive mechanism is configured to impart a reciprocal linear motion to said wave condenser.

65. The device of claim 25, further comprising a hair capturer, operatively associated with said wave condenser, for capturing the hair.

66. The device of claim 65, wherein said hair capturer is selected from the group consisting of a brush, a net and a clamp.

67. The device of claim 65, wherein said hair capturer is operable to lubricate the hair with an ultrasound transmission gel.

68. The device of claim 65, further comprising said ultrasound transmission gel.

69. The device of claim 65, wherein said hair capturer is operable to pull the hair so as to effect a detachment of the hair.

70. The device of claim 39, wherein said ultrasound waves are at a frequency of at least 150 kHz.

71. The device of claim 39, wherein said ultrasound waves are at a frequency of at least 500 kHz.

72. The device of claim 39, wherein said ultrasound waves are at a frequency range of from about 150 kHz to about 1300 kHz.

73. The device of claim 39, wherein said ultrasound waves are at a frequency range of from about 500 kHz to about 1000 kHz.

74. The device of claim 25, wherein said transducer is configured to generate said acoustic waves at a power density of at least 1 watt per square centimeter.

75. The device of claim 25, wherein said transducer is configured to generate said acoustic waves at a power density of from about 1 watt per square centimeter to about 100 watts per square centimeter.

76. A method of treating unwanted hair, comprising gripping a segment of the hair and transmitting acoustic waves through the hair, wherein a length of said segment of the hair is selected so as to enhance an acoustic coupling between the hair and said acoustic waves.

77. The method of claim 76, wherein said transmitting said acoustic waves through the hair is for generating heat at a follicle, a dermal papilla, a hair bulge and/or

a germinal matrix of the hair, said heat being in itself sufficient to damage or destroy said follicle, said dermal papilla, said hair bulge and/or said germinal matrix.

78. The method of claim 76, further comprising using a wave condenser for condensing said acoustic waves, prior to said transmitting of said acoustic waves through the hair.

79. The method of claim 78, wherein said gripping comprises positioning the hair and/or said wave condenser such that a propagation direction of said acoustic waves while entering said wave condenser is generally parallel to a longitudinal axis of the hair.

80. The method of claim 78, wherein said gripping comprises positioning the hair and/or said wave condenser such that a propagation direction of said acoustic waves while entering said wave condenser is generally perpendicular to a longitudinal axis of the hair.

81. The method of claim 78, wherein said gripping comprises positioning the hair and/or said wave condenser such that a propagation direction of said acoustic waves while entering said wave condenser is generally inclined to a longitudinal axis of the hair.

82. The method of claim 78, further comprising pulling the hair so as to effect a detachment of the hair.

83. The method of claim 78, wherein said acoustic coupling is characterized by a coupling length selected such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

84. The method of claim 83, wherein said coupling length is longer than about 1 mm.

85. The method of claim 83, wherein said coupling length is shorter than about 6 mm.

86. The method of claim 76, wherein said generation of said heat is such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

87. The method of claim 76, wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected so as to minimize vibrations of the hair.

88. The method of claim 12, wherein said vibrations of the hair comprises longitudinal vibration of the hair.

89. The method of claim 88, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 10 micrometers.

90. The method of claim 88, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 5 micrometers.

91. The method of claim 76, wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected such that said generation of said heat is such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

92. The method of claim 91, wherein said frequency is an off-resonance frequency.

93. The method of claim 91, wherein said acoustic waves comprise ultrasound waves.

94. The method of claim 93, wherein said ultrasound waves are at a frequency of at least 150 kHz.

95. The method of claim 93, wherein said ultrasound waves are at a frequency of at least 500 kHz.

96. The method of claim 93, wherein said ultrasound waves are at a frequency range of from about 150 kHz to about 1300 kHz.

97. The method of claim 93, wherein said ultrasound waves are at a frequency range of from about 500 kHz to about 1000 kHz.

98. The method of claim 76, wherein duration of transmission of said acoustic waves is less than about 5 seconds.

99. The method of claim 76, wherein duration of transmission of said acoustic waves is less than about 1 second.

100. A device for treating unwanted hair, the device comprising:
a transducer for generating acoustic waves; and
a wave condenser for condensing and transmitting said acoustic waves through the hair, said wave condenser being designed and constructed to grip the hair so as to enhance acoustic coupling between the hair and said acoustic waves.

101. The device of claim 100, wherein said transducer and said wave condenser are designed and constructed such that when said acoustic waves are transmitting through the hair, heat is generated at a follicle, a dermal papilla, a hair bulge and/or a germinal matrix of the hair, said heat being in itself sufficient to damage or destroy said follicle, said dermal papilla, said hair bulge and/or said germinal matrix.

102. The device of claim 100, wherein said wave condenser is designed and constructed such that a propagation direction of said acoustic waves while entering said wave condenser is generally parallel to a longitudinal axis of the hair.

103. The device of claim 100, wherein said wave condenser is designed and constructed such that a propagation direction of said acoustic waves while entering said wave condenser is generally perpendicular to a longitudinal axis of the hair.

104. The device of claim 100, wherein said wave condenser is designed and constructed such that a propagation direction of said acoustic waves while entering said wave condenser is generally inclined to a longitudinal axis of the hair.

105. The device of claim 100, wherein said acoustic coupling is characterized by a coupling length selected such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

106. The device of claim 105, wherein said coupling length is longer than 1 mm.

107. The device of claim 105, wherein said coupling length is shorter than about 6 mm.

108. The device of claim 100, wherein said transducer and said wave condenser are designed and constructed such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

109. The device of claim 100, wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected so as to minimize vibrations of the hair.

110. The device of claim 109, wherein said vibrations of the hair comprises longitudinal vibration of the hair.

111. The device of claim 110, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 10 micrometers.

112. The device of claim 110, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 5 micrometers.

113. The device of claim 100, wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

114. The device of claim 113, wherein said frequency is an off-resonance frequency.

115. The device of claim 113, wherein said transducer is an ultrasound transducer generating ultrasound waves.

116. The device of claim 100, wherein said transducer comprises an active element selected from the group consisting of a piezoelectric ceramic element, and a piezoelectric composite element.

117. The device of claim 116, wherein said transducer comprises a first part and a second part, each of said first part and said second part comprises at least one active element.

118. The device of claim 116, wherein said wave condenser comprises a first part coupled to said first part of said transducer, and a second part coupled to said second part of said transducer.

119. The device of claim 116, wherein said transducer comprises a planar active element.

120. The device of claim 116, wherein said transducer comprises a concaved active element.

121. The device of claim 116, wherein said transducer comprises a plurality of active elements arranged on a surface.

122. The device of claim 121, wherein said surface is a plane.

123. The device of claim 121, wherein said surface is a concaved surface.

124. The device of claim 100, further comprising a focusing element coupling said transducer and said wave condenser, said focusing element being designed and constructed to focus said acoustic waves into said wave condenser.

125. The device of claim 124, wherein said transducer comprises a first part and a second part, each of said first part and said second part comprises at least one active element.

126. The device of claim 116, wherein each of said wave condenser and said focusing element comprises a first part and a second part, and further wherein said first part of said focusing element couples said first part of said transducer and said first part of said wave condenser and said second part of said focusing element couples said second part of said transducer and said second part of said wave condenser.

127. The device of claim 124, wherein said focusing element comprises a tapered housing.

128. The device of claim 127, wherein a profile of said tapered housing is selected from the group consisting of a stepped profile, a linear profile, a segmented linear profile and an exponential profile.

129. The device of claim 121, further comprising a plurality of focusing elements arranged such that each focusing element of said plurality of focusing elements is connected to one active element of said plurality of active elements and being designed and constructed to focus a respective portion of said acoustic waves into said wave condenser.

130. The device of claim 115, wherein said wave condenser comprises a chamber configured to receive the hair such that energy of said acoustic waves is transferred to the hair from a plurality of directions.

131. The device of claim 130, wherein said chamber contains an ultrasound transmission gel.

132. The device of claim 130, wherein said wave condenser comprises a surface characterized by a radius of curvature of from about 1 millimeter to about 10 millimeters.

133. The device of claim 132, wherein a shape of said surface is selected from the group consisting of a sphere, a cylinder, an ellipsoid, a paraboloid, a hyperboloid and any combination or portion thereof.

134. The device of claim 100, wherein said wave condenser is operable to split thereby to form a gap for receiving the hair.

135. The device of claim 100, wherein said wave condenser and said transducer are operable to split thereby to form a gap for receiving the hair.

136. The device of claim 124, wherein said wave condenser and at least one of said transducer and said focusing element are operable to split thereby to form a gap for receiving the hair.

137. The device of claim 134, further comprising a drive mechanism for imparting a motion of said wave condenser relative to the hair.

138. The device of claim 137, wherein said wave condenser is operable to periodically split and reassemble in a manner such that when said wave condenser splits, the hair engages said gap, and when said wave condenser is reassembled, the hair is gripped by said wave condenser and irradiated by said acoustic waves.

139. The device of claim 137, wherein said drive mechanism is configured to impart a rotary motion to said wave condenser.

140. The device of claim 137, wherein said drive mechanism is configured to impart a reciprocal linear motion to said wave condenser.

141. The device of claim 100, further comprising a hair capturer, operatively associated with said wave condenser, for capturing the hair.

142. The device of claim 141, wherein said hair capturer is selected from the group consisting of a brush, a net and a clamp.

143. The device of claim 141, wherein said hair capturer is operable to lubricate the hair with an ultrasound transmission gel.

144. The device of claim 141, further comprising said ultrasound transmission gel.

145. The device of claim 141, wherein said hair capturer is operable to pull the hair so as to effect a detachment of the hair.

146. The device of claim 115, wherein said ultrasound waves are at a frequency of at least 150 kHz.

147. The device of claim 115, wherein said ultrasound waves are at a frequency of at least 500 kHz.

148. The device of claim 115, wherein said ultrasound waves are at a frequency range of from about 150 kHz to about 1300 kHz.

149. The device of claim 115, wherein said ultrasound waves are at a frequency range of from about 500 kHz to about 1000 kHz.

150. The device of claim 100, wherein said transducer is configured to generate said acoustic waves at a power density of at least 1 watt per square centimeter.

151. The device of claim 100, wherein said transducer is configured to generate said acoustic waves at a power density of from about 1 watt per square centimeter to about 100 watts per square centimeter.

152. A method of treating unwanted hair, comprising transmitting acoustic waves through the hair wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected so as to minimize vibrations of the hair.

153. The method of claim 152, wherein said vibrations of the hair comprises longitudinal vibration of the hair.

154. The method of claim 152, wherein said transmitting said acoustic waves through the hair is for generating heat at a follicle, a dermal papilla, a hair bulge and/or a germinal matrix of the hair, said heat being in itself sufficient to damage or destroy said follicle, said dermal papilla, said hair bulge and/or said germinal matrix.

155. The method of claim 152, further comprising using a wave condenser for condensing said acoustic waves, prior to said transmitting of said acoustic waves through the hair.

156. The method of claim 152, further comprising gripping the hair prior to transmitting of said acoustic waves so as to enhance acoustic coupling between the hair and said acoustic waves.

157. The method of claim 156, wherein said gripping comprises positioning the hair and/or said wave condenser such that a propagation direction of said acoustic waves while entering said wave condenser is generally parallel to a longitudinal axis of the hair.

158. The method of claim 156, wherein said gripping comprises positioning the hair and/or said wave condenser such that a propagation direction of said acoustic waves while entering said wave condenser is generally perpendicular to a longitudinal axis of the hair.

159. The method of claim 156, wherein said gripping comprises positioning the hair and/or said wave condenser such that a propagation direction of said acoustic waves while entering said wave condenser is generally inclined to a longitudinal axis of the hair.

160. The method of claim 156, further comprising pulling the hair so as to effect a detachment of the hair.

161. The method of claim 156, wherein said acoustic coupling is characterized by a coupling length selected such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

162. The method of claim 161, wherein said coupling length is longer than about 1 mm.

163. The method of claim 161, wherein said coupling length is shorter than about 6 mm.

164. The method of claim 152, wherein said generation of said heat is such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

165. The method of claim 153, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 10 micrometers.

166. The method of claim 153, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 5 micrometers.

167. The method of claim 152, wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected such that said generation of said heat is such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

168. The method of claim 167, wherein said frequency is an off-resonance frequency.

169. The method of claim 167, wherein said acoustic waves comprise ultrasound waves.

170. The method of claim 169, wherein said ultrasound waves are at a frequency of at least 150 kHz.

171. The method of claim 169, wherein said ultrasound waves are at a frequency of at least 500 kHz.

172. The method of claim 169, wherein said ultrasound waves are at a frequency range of from about 150 kHz to about 1300 kHz.

173. The method of claim 169, wherein said ultrasound waves are at a frequency range of from about 500 kHz to about 1000 kHz.

174. The method of claim 152, wherein duration of transmission of said acoustic waves is less than about 5 seconds.

175. The method of claim 152, wherein duration of transmission of said acoustic waves is less than about 1 second.

176. A device for treating unwanted hair, the device comprising:
a transducer for generating acoustic waves; and
a wave condenser for condensing and transmitting said acoustic waves through the hair;

wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected so as to minimize vibrations of the hair.

177. The device of claim 176, wherein said vibrations of the hair comprises longitudinal vibration of the hair.

178. The device of claim 176, wherein said transducer and said wave condenser are designed and constructed such that when said acoustic waves are transmitting through the hair, heat is generated at a follicle, a dermal papilla, a hair bulge and/or a germinal matrix of the hair, said heat being in itself sufficient to damage or destroy said follicle, said dermal papilla, said hair bulge and/or said germinal matrix.

179. The device of claim 176, wherein said wave condenser is designed and constructed such that a propagation direction of said acoustic waves while entering said wave condenser is generally parallel to a longitudinal axis of the hair.

180. The device of claim 176, wherein said wave condenser is designed and constructed such that a propagation direction of said acoustic waves while entering said wave condenser is generally perpendicular to a longitudinal axis of the hair.

181. The device of claim 176, wherein said wave condenser is designed and constructed such that a propagation direction of said acoustic waves while entering said wave condenser is generally inclined to a longitudinal axis of the hair.

182. The device of claim 176, wherein said wave condenser is designed and constructed to grip the hair so as to enhance acoustic coupling between the hair and said acoustic waves.

183. The device of claim 182, wherein said acoustic coupling is characterized by a coupling length selected such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

184. The device of claim 183, wherein said coupling length is longer than 1 mm.

185. The device of claim 183, wherein said coupling length is shorter than about 6 mm.

186. The device of claim 176, wherein said transducer and said wave condenser are designed and constructed such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

187. The device of claim 177, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 10 micrometers.

188. The device of claim 177, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 5 micrometers.

189. The device of claim 176, wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

190. The device of claim 189, wherein said frequency is an off-resonance frequency.

191. The device of claim 189, wherein said transducer is an ultrasound transducer generating ultrasound waves.

192. The device of claim 176, wherein said transducer comprises an active element selected from the group consisting of a piezoelectric ceramic element, and a piezoelectric composite element.

193. The device of claim 192, wherein said transducer comprises a first part and a second part, each of said first part and said second part comprises at least one active element.

194. The device of claim 192, wherein said wave condenser comprises a first part coupled to said first part of said transducer, and a second part coupled to said second part of said transducer.

195. The device of claim 192, wherein said transducer comprises a planar active element.

196. The device of claim 192, wherein said transducer comprises a concaved active element.

197. The device of claim 192, wherein said transducer comprises a plurality of active elements arranged on a surface.

198. The device of claim 197, wherein said surface is a plane.

199. The device of claim 197, wherein said surface is a concaved surface.

200. The device of claim 176, further comprising a focusing element coupling said transducer and said wave condenser, said focusing element being designed and constructed to focus said acoustic waves into said wave condenser.

201. The device of claim 200, wherein said transducer comprises a first part and a second part, each of said first part and said second part comprises at least one active element.

202. The device of claim 192, wherein each of said wave condenser and said focusing element comprises a first part and a second part, and further wherein said first part of said focusing element couples said first part of said transducer and said first part of said wave condenser and said second part of said focusing element couples said second part of said transducer and said second part of said wave condenser.

203. The device of claim 200, wherein said focusing element comprises a tapered housing.

204. The device of claim 203, wherein a profile of said tapered housing is selected from the group consisting of a stepped profile, a linear profile, a segmented linear profile and an exponential profile.

205. The device of claim 197, further comprising a plurality of focusing elements arranged such that each focusing element of said plurality of focusing elements is connected to one active element of said plurality of active elements and being designed and constructed to focus a respective portion of said acoustic waves into said wave condenser.

206. The device of claim 191, wherein said wave condenser comprises a chamber configured to receive the hair such that energy of said acoustic waves is transferred to the hair from a plurality of directions.

207. The device of claim 206, wherein said chamber contains an ultrasound transmission gel.

208. The device of claim 206, wherein said wave condenser comprises a surface characterized by a radius of curvature of from about 1 millimeter to about 10 millimeters.

209. The device of claim 208, wherein a shape of said surface is selected from the group consisting of a sphere, a cylinder, an ellipsoid, a paraboloid, a hyperboloid and any combination or portion thereof.

210. The device of claim 176, wherein said wave condenser is operable to split thereby to form a gap for receiving the hair.

211. The device of claim 176, wherein said wave condenser and said transducer are operable to split thereby to form a gap for receiving the hair.

212. The device of claim 200, wherein said wave condenser and at least one of said transducer and said focusing element are operable to split thereby to form a gap for receiving the hair.

213. The device of claim 210, further comprising a drive mechanism for imparting a motion of said wave condenser relative to the hair.

214. The device of claim 213, wherein said wave condenser is operable to periodically split and reassemble in a manner such that when said wave condenser splits, the hair engages said gap, and when said wave condenser is reassembled, the hair is gripped by said wave condenser and irradiated by said acoustic waves.

215. The device of claim 213, wherein said drive mechanism is configured to impart a rotary motion to said wave condenser.

216. The device of claim 213, wherein said drive mechanism is configured to impart a reciprocal linear motion to said wave condenser.

217. The device of claim 176, further comprising a hair capturer, operatively associated with said wave condenser, for capturing the hair.

218. The device of claim 217, wherein said hair capturer is selected from the group consisting of a brush, a net and a clamp.

219. The device of claim 217, wherein said hair capturer is operable to lubricate the hair with an ultrasound transmission gel.

220. The device of claim 217, further comprising said ultrasound transmission gel.

221. The device of claim 217, wherein said hair capturer is operable to pull the hair so as to effect a detachment of the hair.

222. The device of claim 191, wherein said ultrasound waves are at a frequency of at least 150 kHz.

223. The device of claim 191, wherein said ultrasound waves are at a frequency of at least 500 kHz.

224. The device of claim 191, wherein said ultrasound waves are at a frequency range of from about 150 kHz to about 1300 kHz.

225. The device of claim 191, wherein said ultrasound waves are at a frequency range of from about 500 kHz to about 1000 kHz.

226. The device of claim 176, wherein said transducer is configured to generate said acoustic waves at a power density of at least 1 watt per square centimeter.

227. The device of claim 176, wherein said transducer is configured to generate said acoustic waves at a power density of from about 1 watt per square centimeter to about 100 watts per square centimeter.

228. A method of treating unwanted hair, comprising transmitting acoustic waves at a frequency of from about 150 kHz to about 1300 kHz through the hair.

229. The method of claim 228, wherein said transmitting said acoustic waves through the hair is for generating heat at a follicle, a dermal papilla, a hair bulge and/or a germinal matrix of the hair, said heat being in itself sufficient to damage or destroy said follicle, said dermal papilla, said hair bulge and/or said germinal matrix.

230. The method of claim 228, further comprising using a wave condenser for condensing said acoustic waves, prior to said transmitting of said acoustic waves through the hair.

231. The method of claim 228, further comprising gripping the hair prior to transmitting of said acoustic waves so as to enhance acoustic coupling between the hair and said acoustic waves.

232. The method of claim 231, wherein said gripping comprises positioning the hair and/or said wave condenser such that a propagation direction of said acoustic

waves while entering said wave condenser is generally parallel to a longitudinal axis of the hair.

233. The method of claim 231, wherein said gripping comprises positioning the hair and/or said wave condenser such that a propagation direction of said acoustic waves while entering said wave condenser is generally perpendicular to a longitudinal axis of the hair.

234. The method of claim 231, wherein said gripping comprises positioning the hair and/or said wave condenser such that a propagation direction of said acoustic waves while entering said wave condenser is generally inclined to a longitudinal axis of the hair.

235. The method of claim 231, further comprising pulling the hair so as to effect a detachment of the hair.

236. The method of claim 231, wherein said acoustic coupling is characterized by a coupling length selected such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

237. The method of claim 236, wherein said coupling length is longer than about 1 mm.

238. The method of claim 236, wherein said coupling length is shorter than about 6 mm.

239. The method of claim 228, wherein said generation of said heat is such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

240. The method of claim 228, wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected so as to minimize vibrations of the hair.

241. The method of claim 12, wherein said vibrations of the hair comprises longitudinal vibration of the hair.

242. The method of claim 241, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 10 micrometers.

243. The method of claim 241, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 5 micrometers.

244. The method of claim 228, wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected such that said generation of said heat is such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

245. The method of claim 244, wherein said frequency is an off-resonance frequency.

246. The method of claim 228, wherein duration of transmission of said acoustic waves is less than about 5 seconds.

247. The method of claim 228, wherein duration of transmission of said acoustic waves is less than about 1 second.

248. A device (20) for treating unwanted hair, the device comprising:

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a transducer (22) for generating acoustic waves;
characterized in that

said acoustic waves being at a frequency of from about 150 kHz to about 1300 kHz; and

the device further comprises a wave condenser (24) for condensing and transmitting said acoustic waves through the hair (28) ;

wherein said transducer and said wave condenser are designed and constructed such that when said acoustic waves are transmitting through the hair, heat is generated at a follicle, a dermal papilla, a hair bulge and/or a germinal matrix of the hair.

249. The device of claim 248, wherein said heat is in itself sufficient to damage or destroy said follicle, said dermal papilla, said hair bulge and/or said germinal matrix.

250. The device of claim 248, wherein said wave condenser is designed and constructed such that a propagation direction of said acoustic waves while entering said wave condenser is generally parallel to a longitudinal axis of the hair.

251. The device of claim 248, wherein said wave condenser is designed and constructed such that a propagation direction of said acoustic waves while entering said wave condenser is generally perpendicular to a longitudinal axis of the hair.

252. The device of claim 248, wherein said wave condenser is designed and constructed such that a propagation direction of said acoustic waves while entering said wave condenser is generally inclined to a longitudinal axis of the hair.

253. The device of claim 248, wherein said wave condenser is designed and constructed to grip the hair so as to enhance acoustic coupling between the hair and said acoustic waves.

254. The device of claim 253, wherein said acoustic coupling is characterized by a coupling length selected such that said heat at said follicle, said

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dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

255. The device of claim 254, wherein said coupling length is longer than 1 mm.

256. The device of claim 254, wherein said coupling length is shorter than about 6 mm.

257. The device of claim 248, wherein said transducer and said wave condenser are designed and constructed such that said heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

258. The device of claim 248, wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected so as to minimize vibrations of the hair.

259. The device of claim 258, wherein said vibrations of the hair comprises longitudinal vibration of the hair.

260. The device of claim 259, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 10 micrometers.

261. The device of claim 259, wherein said frequency, said power density and/or said duration of transmission of said acoustic waves is selected such that a characteristic amplitude of said longitudinal vibrations of the hair is below 5 micrometers.

262. The device of claim 248, wherein at least one of: a frequency, a power density and duration of transmission of said acoustic waves is selected such that said

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heat at said follicle, said dermal papilla, said hair bulge and/or said germinal matrix results in a temperature increment of at least 20 degrees centigrade.

263. The device of claim 262, wherein said frequency is an off-resonance frequency.

264. The device of claim 262, wherein said transducer is an ultrasound transducer generating ultrasound waves.

265. The device of claim 248, wherein said transducer comprises an active element selected from the group consisting of a piezoelectric ceramic element, and a piezoelectric composite element.

266. The device of claim 265, wherein said transducer comprises a first part and a second part, each of said first part and said second part comprises at least one active element.

267. The device of claim 265, wherein said wave condenser comprises a first part coupled to said first part of said transducer, and a second part coupled to said second part of said transducer.

268. The device of claim 265, wherein said transducer comprises a planar active element.

269. The device of claim 265, wherein said transducer comprises a concaved active element.

270. The device of claim 265, wherein said transducer comprises a plurality of active elements arranged on a surface.

271. The device of claim 270, wherein said surface is a plane.

272. The device of claim 270, wherein said surface is a concaved surface.

273. The device of claim 248, further comprising a focusing element coupling said transducer and said wave condenser, said focusing element being designed and constructed to focus said acoustic waves into said wave condenser.

274. The device of claim 273, wherein said transducer comprises a first part and a second part, each of said first part and said second part comprises at least one active element.

275. The device of claim 265, wherein each of said wave condenser and said focusing element comprises a first part and a second part, and further wherein said first part of said focusing element couples said first part of said transducer and said first part of said wave condenser and said second part of said focusing element couples said second part of said transducer and said second part of said wave condenser.

276. The device of claim 273, wherein said focusing element comprises a tapered housing.

277. The device of claim 276, wherein a profile of said tapered housing is selected from the group consisting of a stepped profile, a linear profile, a segmented linear profile and an exponential profile.

278. The device of claim 270, further comprising a plurality of focusing elements arranged such that each focusing element of said plurality of focusing elements is connected to one active element of said plurality of active elements and being designed and constructed to focus a respective portion of said acoustic waves into said wave condenser.

279. The device of claim 264, wherein said wave condenser comprises a chamber configured to receive the hair such that energy of said acoustic waves is transferred to the hair from a plurality of directions.

280. The device of claim 279, wherein said chamber contains an ultrasound transmission gel.

281. The device of claim 279, wherein said wave condenser comprises a surface characterized by a radius of curvature of from about 1 millimeter to about 10 millimeters.

282. The device of claim 281, wherein a shape of said surface is selected from the group consisting of a sphere, a cylinder, an ellipsoid, a paraboloid, a hyperboloid and any combination or portion thereof.

283. The device of claim 248, wherein said wave condenser is operable to split thereby to form a gap for receiving the hair.

284. The device of claim 248, wherein said wave condenser and said transducer are operable to split thereby to form a gap for receiving the hair.

285. The device of claim 273, wherein said wave condenser and at least one of said transducer and said focusing element are operable to split thereby to form a gap for receiving the hair.

286. The device of claim 283, further comprising a drive mechanism for imparting a motion of said wave condenser relative to the hair.

287. The device of claim 286, wherein said wave condenser is operable to periodically split and reassemble in a manner such that when said wave condenser splits, the hair engages said gap, and when said wave condenser is reassembled, the hair is gripped by said wave condenser and irradiated by said acoustic waves.

288. The device of claim 286, wherein said drive mechanism is configured to impart a rotary motion to said wave condenser.

289. The device of claim 286, wherein said drive mechanism is configured to impart a reciprocal linear motion to said wave condenser.

290. The device of claim 248, further comprising a hair capturer, operatively associated with said wave condenser, for capturing the hair.

291. The device of claim 290, wherein said hair capturer is selected from the group consisting of a brush, a net and a clamp.

292. The device of claim 290, wherein said hair capturer is operable to lubricate the hair with an ultrasound transmission gel.

293. The device of claim 290, further comprising said ultrasound transmission gel.

294. The device of claim 290, wherein said hair capturer is operable to pull the hair so as to effect a detachment of the hair.

295. The device of claim 264, wherein said ultrasound waves are at a frequency of at least 150 kHz.

296. The device of claim 264, wherein said ultrasound waves are at a frequency of at least 500 kHz.

297. The device of claim 264, wherein said ultrasound waves are at a frequency range of from about 150 kHz to about 1300 kHz.

298. The device of claim 264, wherein said ultrasound waves are at a frequency range of from about 500 kHz to about 1000 kHz.

299. The device of claim 248, wherein said transducer is configured to generate said acoustic waves at a power density of at least 1 watt per square centimeter.

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300. The device of claim 248, wherein said transducer is configured to generate said acoustic waves at a power density of from about 1 watt per square centimeter to about 100 watts per square centimeter.